described as a useful tool to lower the risk of aspiration pneumonitis.

Endotracheal suctioning is an important initial therapeutic step. Because the aspirated material is rarely entirely removed, other therapeutic measures are also required. Bronchoscopy should be done on anyone who has aspirated particulate matter, especially if there is clinical or radiologic evidence of segmental loss in lung volume. Routine bronchial lavage with neutral or alkaline solutions is not effective, and the use of corticosteroids remains controversial. Although prophylactic antibiotics have been advocated, their effectiveness is doubtful because their use has demonstrated no proved benefit on ultimate outcome. A more logical approach is to closely monitor the patient for clinical and bacteriologic evidence of infection using uncontaminated specimens of tracheal aspirates.

When the patient's hypoxemia can no longer be corrected without using toxic levels of oxygen, positive end-expiratory pressure should be instituted. The actual level of pressure required will vary with each patient, but levels as high as 30 cm of water occasionally have been necessary. Barotrauma, such as pneumothorax, and impaired cardiovascular function should be anticipated and, when present, appropriately treated.

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Long-term Use of Oxygen Therapy

OUTPATIENT OXYGEN THERAPY (OPOT) has improved the survival rate and neuropsychological function, as well as lowering pulmonary hypertension and erythrocytosis, in selected patients with hypoxemic chronic obstructive pulmonary disease (COPD). Continuous (21 to 24 hours per day) OPOT reduces mortality substantially as compared with the 12-hour (per day) regimen. Treatment programs providing less than 12 hours a day of OPOT have no proven benefit except for relieving subjective symptoms or improving exercise tolerance while the patient is breathing oxygen.

In most patients with COPD, improvement of hypoxemia will occur once pulmonary or cardiopulmonary exacerbations are properly treated. Short-term oxygen therapy is used during exacerbations until resting arterial oxygen exceeds 55 to 60 mm of mercury. When the patient's condition has been stable for a month following discharge from hospital, a decision regarding long-term OPOT should be made. Cor pulmonale, erythrocytosis, mental changes and sleep disorders are clues to possible persistent hypoxemia and a need for OPOT; however, these may be lacking or unrecognized.

Obtaining arterial blood gas measurements on several occasions during a one-month stability period will aid the prescriber in determining whether long-term OPOT is needed.

In selected COPD patients, OPOT will improve exercise tolerance. Most patients with COPD have exercise limitations and breathlessness unrelated to hypoxemia. There are no conclusive studies as to whether chronically hypoxemic and stable patients with diseases other than COPD benefit in a similar manner or degree from long-term OPOT.

Proper patient selection is important because OPOT is expensive ($200 to $400 per month) and easily mistaken as a panacea. Stable outpatients with an arterial oxygen pressure (Pao_2) of 55 mm of mercury or less are considered candidates for OPOT. A patient with a Pao_2 of between 55 and 60 mm of mercury may be treated when cor pulmonale or erythrocytosis is present. The adequacy of the prescribed OPOT dose should be established every three to four months. Oxygen supplementation should provide a Pao_2 of 60 to 80 mm of mercury. Careful patient education, often underemphasized, is essential.

OPOT is usually administered during sleep because there is a greater likelihood of severe prolonged desaturation during this time. A small increment to the daytime flow rates often is necessary to maintain adequate sleep oxygenation.

Cost, convenience and familiarity are the determining factors for choice of OPOT equipment. When properly instructed and monitored, OPOT has proved to be safe, with rare and usually minor problems. The new oxygen concentrator systems have the advantage of necessitating fewer home visits by the supplier. A portable back-up system should augment the concentrator because the latter is not mobile and is subject to electrical power failures.

Long-term OPOT, although beneficial for selected hypoxemic patients, is only one component of a

comprehensive outpatient care program to minimize the incidence of mortality, morbidity and admittance to hospital. Proper selection and education of patients as well as follow-up analyses will help to avoid financial waste, unrealistic expectations and poorly coordinated treatment regimens.

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Computed Tomography in Lung Disease

COMPUTED TOMOGRAPHIC (CT) scanning in patients with lung disease has proved useful in (1) detection and evaluation of solitary pulmonary nodules, (2) detection of pulmonary metastasis, (3) diagnosis and evaluation of vascular lung lesions, (4) distinguishing between pulmonary parenchymal and pleural processes, (5) the detection and evaluation of diffuse pulmonary disease and (6) carrying out percutaneous needle aspiration biopsy.

In general, CT is more sensitive than are plain radiographs or conventional tomograms in the detection of single or multiple pulmonary nodules. For this reason, CT is largely replacing conventional tomographic studies for the detection of nodular disease. In patients with a solitary nodule visible on plain radiographs, CT can be used to search for other nodules or associated mediastinal adenopathy; CT is also more sensitive in detecting mediastinal lesions. CT densitometry of solitary nodules may be of some value in distinguishing benign and malignant lesions, the presumption being that benign lesions often contain calcium invisible on plain radiographs but detectable by CT. In one study, excellent results were obtained by measuring the CT number of lung nodules detected. However, these results have been difficult to duplicate, and CT nodule densitometry, at this time, must be considered experimental or of limited clinical value.

Because of its enhanced sensitivity and ability to view the mediastinum, CT should replace other radiographic procedures in the detection of pulmonary metastasis in most cases.

Dynamic CT scanning following a bolus injection of contrast material can be used to diagnose and evaluate pulmonary vascular lesions, such as arteriovenous fistula, pulmonary vein varix and sequestration. However, vascular tumors (bronchial adenoma) sometimes may produce false-positive results. In some cases, CT may replace arteriography.

Because of its cross-sectional format, CT is ideally suited to the distinction of pulmonary parenchymal disease and pleural disease when plain chest radiographs are equivocal. However, although CT has been reported helpful in differentiating empyema and lung abscess, this distinction can be difficult.

CT is extremely sensitive in detecting subtle differences in density and can show pulmonary fibrosis in patients with various lung diseases (such as sarcoidosis or asbestosis) when plain chest radiographs show no abnormalities. Also, CT shows areas of decreased density (such as bullae or emphysema) better than other radiographic techniques.

Lastly, in patients with pulmonary lesions requiring percutaneous biopsy, CT can be extremely useful in needle placement and precise localization of the needle tip. By using CT, lesions in the lung that are close to vascular structures can be safely approached.

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Diagnosis and Management of Goodpasture's Syndrome

GOODPASTURE'S SYNDROME involves a triad of glomerulonephritis, pulmonary hemorrhage and antiglomerular basement membrane antibody (anti-GBM) production. The cause of this disorder is unknown, although some patients have a history of recent viral illness or exposure to volatile hydrocarbons. It is an uncommon but serious disorder in which a rapidly progressive, crescentic glomerulonephritis develops, which leads to uremia. Pulmonary hemorrhage in the syndrome may be life-threatening, and evidence of its presence—that is, hemoptysis, infiltrates noted on x-ray films, reduced arterial oxygen tension, hemosiderin-laden macrophages and iron deficiency anemia—is